

GCSE Maths: Factorising $x^2 + bx + c$ and the difference of two squares (Higher): worksheet

GCSE Maths - Algebra Basics - Higher - Lesson 7.7

Name: _____

Date: _____

Score: _____

31 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch07-algebra-basics/higher/factorising-x-bx-c-and-the-difference-of-two-squares/

Exercise 7G Factorising $x^2 + bx + c$ Non-calculator

1 Factorise each expression.

(a) $x^2 + 5x + 6$

Answer: _____

(b) $x^2 + 7x + 10$

Answer: _____

(c) $x^2 + 8x + 15$

Answer: _____

(d) $x^2 + 9x + 20$

Answer: _____

(e) $x^2 + 10x + 24$

Answer: _____

(f) $x^2 + 6x + 8$

Answer: _____

2 Factorise each expression.

(a) $x^2 - 7x + 12$

Answer: _____

(b) $x^2 - 6x + 8$

Answer: _____

(c) $x^2 - 10x + 21$

Answer: _____

(d) $x^2 - 8x + 15$

Answer: _____

(e) $x^2 - 9x + 14$

Answer: _____

3 Factorise each expression.

(a) $x^2 + 2x - 8$

Answer: _____

(b) $x^2 - x - 12$

Answer:

(c) $x^2 + 3x - 18$

Answer:

(d) $x^2 - 4x - 5$

Answer:

(e) $x^2 + 5x - 14$

Answer:

(f) $x^2 - 2x - 24$

Answer:

4 Fill in the missing numbers.

(a) $x^2 + 9x + 14 = (x + ?)(x + ?)$

Answer:

(b) $x^2 - 8x + 15 = (x - ?)(x - ?)$

Answer:

(c) $x^2 + x - 12 = (x + ?)(x - ?)$

Answer:

5 Factorise each expression.

(a) $y^2 + 8y + 12$

Answer:

(b) $a^2 - a - 20$

Answer:

(c) $p^2 - 10p + 16$

Answer:

(d) $m^2 + 4m - 21$

Answer:

6 These are perfect squares. Factorise each one and write your answer as a squared bracket.

(a) $x^2 + 6x + 9$

Answer:

(b) $x^2 - 10x + 25$

Answer:

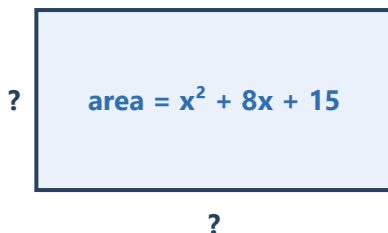
(c) $x^2 + 14x + 49$

Answer:

(d) $y^2 - 4y + 4$

Answer:

- 7** A rectangle has area $(x^2 + 8x + 15) \text{ cm}^2$. (a) Factorise the expression to find the lengths of its two sides. (b) Write a simplified expression for the perimeter.



- (a) the lengths of the two sides

Answer:

- (b) the perimeter

Answer:

- 8** The area of a rectangular patio is $(x^2 + 7x + 12) \text{ m}^2$. Its width is $(x + 3) \text{ m}$. Find an expression for its length.

Answer:

- 9** Zak factorises $x^2 + 5x + 6$ as $(x + 1)(x + 6)$. Show that Zak is wrong, and find the correct answer.

Answer:

- 10** Explain why $x^2 + 5x + 7$ cannot be factorised into brackets with whole numbers.

Answer:

- 11** Show that $x^2 - x - 6 = (x - 3)(x + 2)$ by expanding the brackets.

Answer:

- 12** Factorise each expression.

- (a) $x^2 - x - 72$

Answer:

- (b) $x^2 + 14x + 48$

Answer:

- (c) $x^2 - 17x + 72$

Answer:

- (d) $x^2 + x - 90$

Answer:

- 13** Factorise each expression fully.

- (a) $2x^2 + 10x + 12$

Answer:

- (b) $3x^2 - 12x - 15$

Answer:

- (c) $5x^2 - 5x - 30$

Answer:

(d) $4x^2 - 4x - 24$

Answer:

- 14 $x^2 + bx + 12$ can be factorised into two brackets with whole numbers. Find all the possible values of b .

Answer:

- 15 $x^2 + bx - 12$ can be factorised into two brackets with whole numbers. Find all the possible values of b .

Answer:

Exercise 7H Difference of two squares and mixed factorising

Non-calculator

- 1 Factorise each expression.

(a) $x^2 - 9$

Answer:

(b) $x^2 - 25$

Answer:

(c) $y^2 - 49$

Answer:

(d) $a^2 - 100$

Answer:

(e) $p^2 - 1$

Answer:

(f) $x^2 - 64$

Answer:

- 2 Factorise each expression.

(a) $4x^2 - 9$

Answer:

(b) $9y^2 - 1$

Answer:

(c) $16a^2 - 25$

Answer:

(d) $100x^2 - 81$

Answer:

- 3 Use the difference of two squares to work out each answer without a calculator.

(a) $51^2 - 49^2$

Answer:

(b) $99^2 - 1^2$

Answer:

(c) $7.5^2 - 2.5^2$

Answer:

(d) $1001^2 - 999^2$

Answer:

4 Factorise each expression fully. (Look for a common factor first.)

(a) $2x^2 - 8$

Answer:

(b) $3x^2 - 75$

Answer:

(c) $5y^2 - 20$

Answer:

(d) $4a^2 - 100$

Answer:

(e) $7x^2 - 7$

Answer:

5 Factorise each expression.

(a) $x^2 - y^2$

Answer:

(b) $9a^2 - 4b^2$

Answer:

(c) $25p^2 - 16q^2$

Answer:

(d) $49m^2 - n^2$

Answer:

6 Factorise each expression.

(a) $25 - x^2$

Answer:

(b) $49 - 4y^2$

Answer:

(c) $1 - 9a^2$

Answer:

7 A square of side 10 cm has a small square of side x cm cut from one corner. (a) Write an expression for the area that is left. (b) Factorise your expression.

(a) the area left

Answer:

(b) factorise it

Answer:

- 8 One square has side 13 cm and another has side 7 cm. Work out the difference between their areas without a calculator.

Answer:

- 9 Explain why $x^2 + 16$ cannot be factorised using the difference of two squares.

Answer:

- 10 Ravi factorises $x^2 - 16$ as $(x - 4)(x - 4)$. Is he correct? Explain.

Answer:

- 11 Is $x^2 - 12$ a difference of two squares? Explain your answer.

Answer:

- 12 Factorise each expression fully. Each one uses a different method.

(a) $x^2 + 9x$

Answer:

(b) $x^2 - x - 20$

Answer:

(c) $x^2 - 36$

Answer:

(d) $3x^2 + 6x$

Answer:

(e) $y^2 - 2y - 24$

Answer:

(f) $2x^2 - 50$

Answer:

- 13 Factorise each expression.

(a) $16x^2 - 81y^2$

Answer:

(b) $121a^2 - 4b^2$

Answer:

(c) $36p^2q^2 - 1$

Answer:

(d) $25x^4 - 9$

Answer:

- 14 Factorise fully $x^4 - 16$.

Answer:

15 Factorise $(x + 3)^2 - 16$.

Answer:

16 Work out $8.5^2 - 1.5^2$ without a calculator, and show your method.

Answer:

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